

**Introduction to Physical Science** ▪ *Reading/Notetaking Guide***Measurement** (pp. 16–26)

*This section explains why scientists use a standard measurement system and identifies the standard units used for common measurements. It also explains how to convert from one unit to another.*

**Use Target Reading Skills**

*Before you read, look at the red headings in this section of the textbook. Then complete the graphic organizer by writing each red heading and a question about that topic. Answer your questions as you read.*

Measurement		
Heading	Question	Answer
A Standard Measurement System		
Length		

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**A Standard Measurement System** (p. 17)

1. What is the metric system?  
\_\_\_\_\_  
\_\_\_\_\_
2. Modern scientists use a version of the metric system called the \_\_\_\_\_,  
abbreviated \_\_\_\_\_.
3. Circle the letter of each advantage of using SI as the standard system of measurements.
  - a. Using SI allows scientists to compare data.
  - b. Every country can have its own system.
  - c. All units are expressed in the French language.
  - d. Scientists can communicate with each other about their results.
4. SI units are based on multiples of \_\_\_\_\_.

*Match the SI prefix with its meaning by writing the letter of the meaning in the correct blank.*

- |                  |                           |
|------------------|---------------------------|
| _____ 5. hecto-  | a. 1,000                  |
| _____ 6. deci-   | b. 100                    |
| _____ 7. milli-  | c. 10                     |
| _____ 8. kilo-   | d. 0.1 (one tenth)        |
| _____ 9. deka-   | e. 0.01 (one hundredth)   |
| _____ 10. centi- | f. 0.001 (one thousandth) |

11. Is the following sentence true or false? Each SI unit is 10 times smaller than the next smallest unit. \_\_\_\_\_

**Length** (pp. 18–20)

12. What is length?  
\_\_\_\_\_  
\_\_\_\_\_
13. The basic unit of length in the SI system is the \_\_\_\_\_.

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**Measurement** *(continued)*

14. Which of the following sentences are true about meter measurements?
- a. Most 13-year-olds are between 1.5 and 2 centimeters tall.
  - b. The distance from the floor to a common doorknob is about 1 meter.
  - c. The ceiling in your classroom is about 1 meter above the floor.
  - d. Your arm is about 20 meters long.
15. One meter equals \_\_\_\_\_ centimeters.
16. Circle the letter of a common tool used to measure length.
- a. metric balance
  - b. metric ruler
  - c. graduated cylinder
  - d. thermometer

**Weight and Mass** (pp. 20–21)

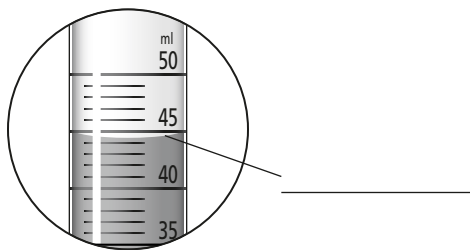
17. What is mass?
- \_\_\_\_\_
- \_\_\_\_\_
18. The basic unit of mass in the SI system is the \_\_\_\_\_.
19. 1 kilogram = 1,000 \_\_\_\_\_.
20. A device that works by comparing the mass of an object to a known mass is called a(n) \_\_\_\_\_.
21. Circle the letter of the best definition of weight.
- a. A measure of the amount of matter an object contains
  - b. A measure of the amount of space an object takes up
  - c. A measure of the force of gravity acting on an object
  - d. A measure of how much mass is contained in a given volume

**Volume** (pp. 22–23)

22. What is volume?
- \_\_\_\_\_
- \_\_\_\_\_
23. The tool that scientists commonly use to measure liquid volume is the \_\_\_\_\_.
24. 1 \_\_\_\_\_ = 1,000 milliliters

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25. What does the line point to? Write your answer in the space provided.



26. Circle the letter of each unit that can be used to measure the volume of a solid object.

- a. cubic meter ( $\text{m}^3$ )
- b. cubic gram ( $\text{g}^3$ )
- c. square centimeter ( $\text{cm}^2$ )
- d. cubic centimeter ( $\text{cm}^3$ )

27. What is the formula used to calculate the volume of a rectangular solid?

\_\_\_\_\_

28. Is the following sentence true or false? One method used to measure the volume of an irregular solid involves immersing the object in water. \_\_\_\_\_

**Density** (pp. 24–25)

29. What is density?

\_\_\_\_\_  
\_\_\_\_\_

30. What is the formula used to calculate the density of an object?

\_\_\_\_\_

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**Measurement** (*continued*)

31. Circle the letter of each common unit of density.

- a. grams per milliliter (g/mL)
- b. cubic gram (g<sup>3</sup>)
- c. grams per cubic centimeter (g/cm<sup>3</sup>)
- d. cubic centimeter (cm<sup>3</sup>)

32. What is the density of an object with a volume of 20 cm<sup>3</sup> and a mass of 40 g?

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33. Is the following sentence true or false? The density of a substance is the same for all samples of the substance. \_\_\_\_\_

34. An object will float if it is \_\_\_\_\_ dense than the surrounding liquid.

**Time** (p. 25)

35. What is the SI unit used to measure time?

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36. 1 second = 1,000 \_\_\_\_\_.

**Temperature** (p. 26)

37. The temperature scale that scientists commonly use is the \_\_\_\_\_ temperature scale.

38. What is the official SI unit for temperature? \_\_\_\_\_

39. Circle each sentence that is true about the Kelvin scale.

- a. The Kelvin scale has no negative numbers.
- b. Absolute zero is equal to  $-273^{\circ}$  on the Kelvin scale.
- c. Nothing can get colder than 0 K.
- d. Water boils at 373 K.